Radio sky above Upton

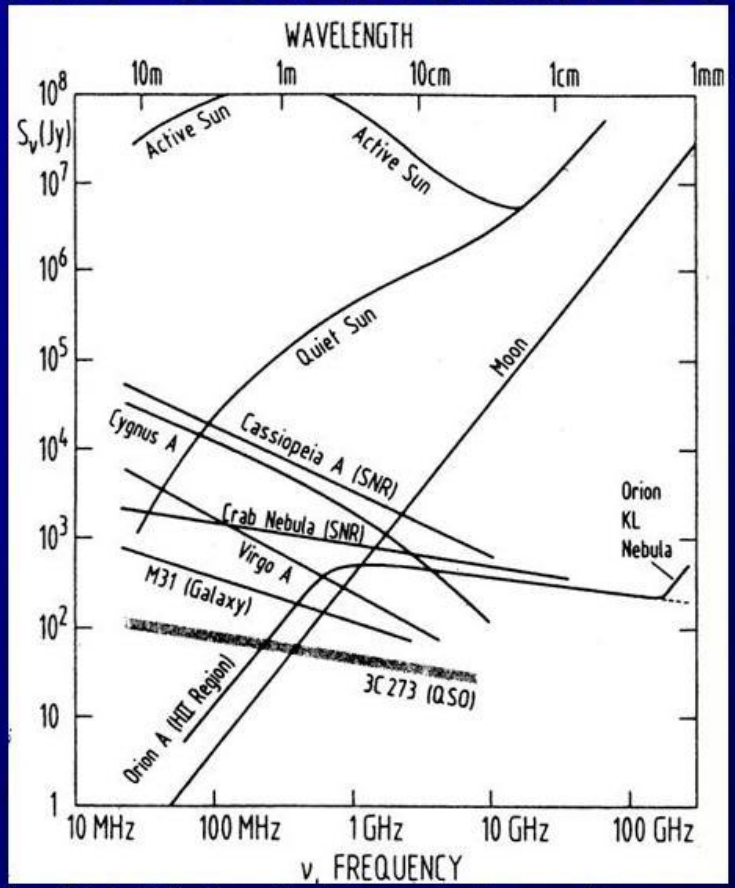
Catalog of sources

- NORTH20CM catalog:

This is the 20-cm Northern Sky Catalog of White, R. L. and Becker, R. H. (1992, Ap.J.Supp., in press) containing 30,239 sources detected from the Condon Greenbank images taken at 1.4 GHz over the declination range of -5 degrees to 82 degrees with a flux density limit of 100 mJy. This 20 cm catalog also contains the results of a cross-correlation with catalogs at 6 and 80 cm covering the northern sky between Dec=0 degrees and 70 degrees to give the spectral indices at three frequencies for about 20,000 sources.

- However, I could not find Crab Nebula in it. Probably have some bright side cut, so not very useful.

Galactic Continuum Sources

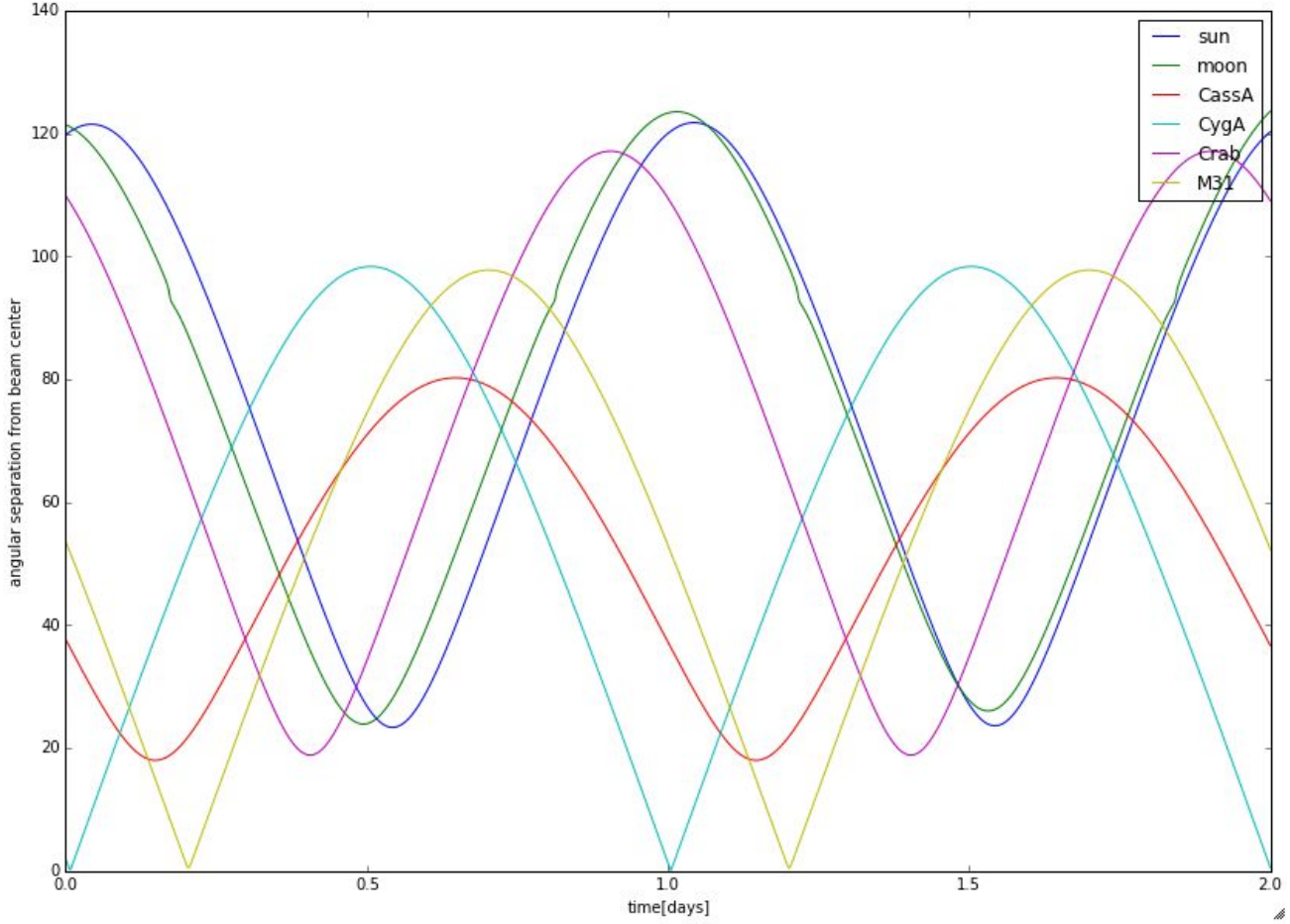


S_ν in Jy is 10^{-26} W m^{-2} Hz^{-1} (intensity integrated over the source)

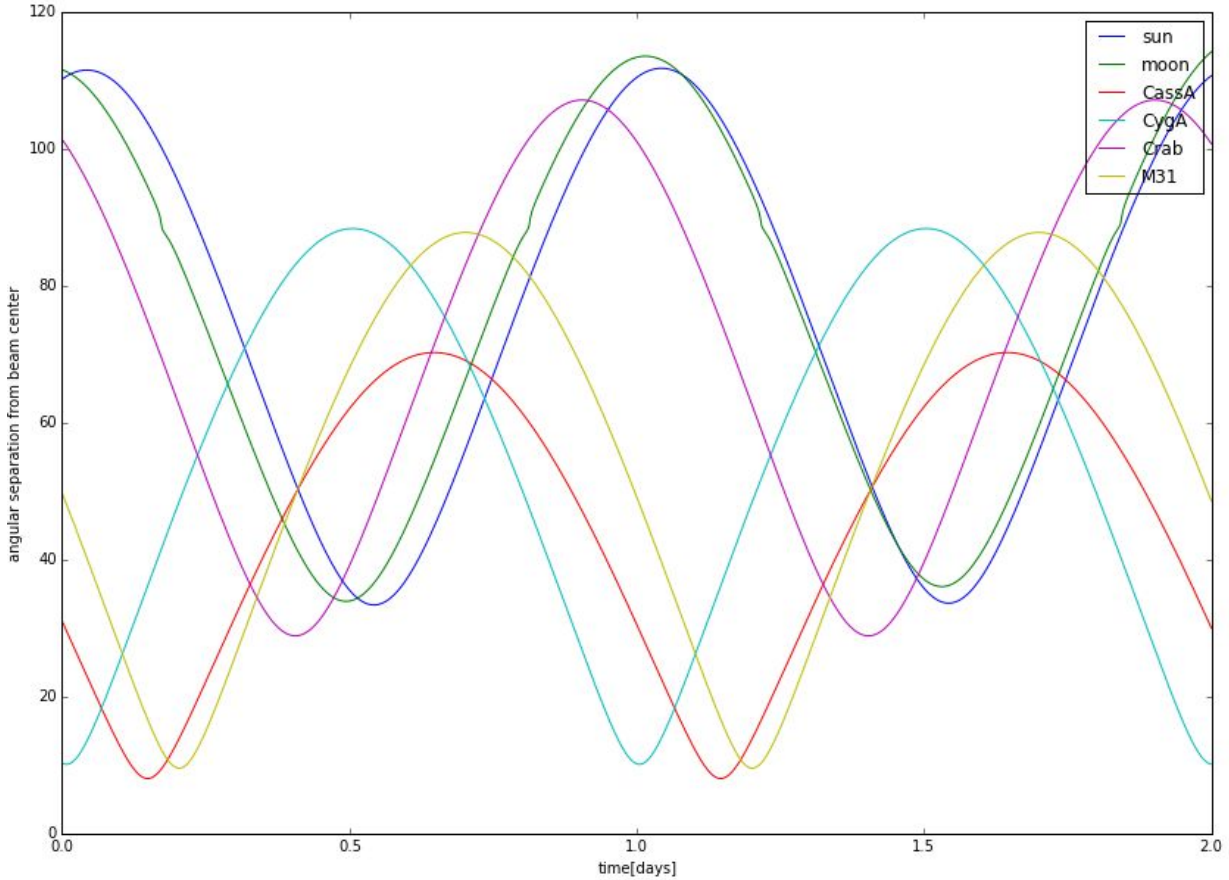
My catalog

- Copied the coordinates of those sources from the web
- Read off fluxes at 100MHz and 1GHz assuming power-law
- Stankus’ email gives precise coordinates of the white house
- Astropy can do all transformation trivially these days

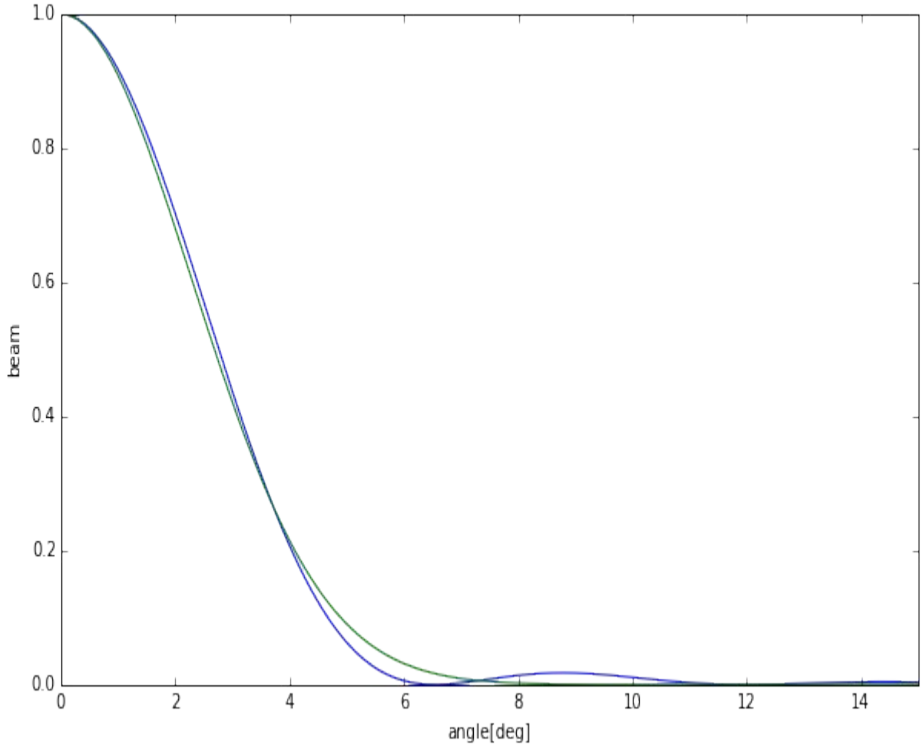
Two days in August, pointing at the zenith

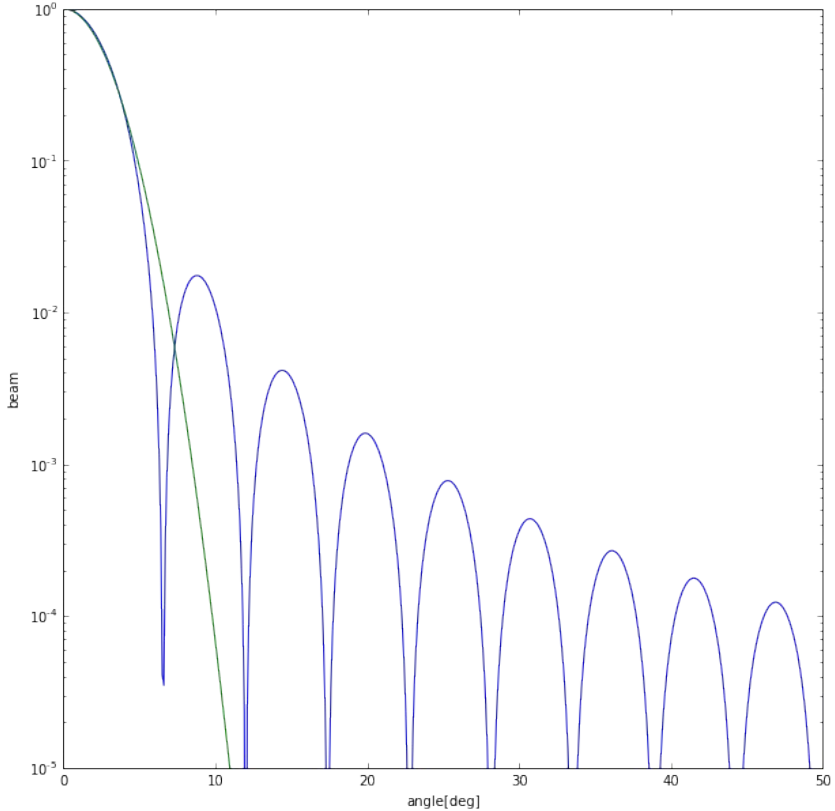


Same but pointing 10 deg north

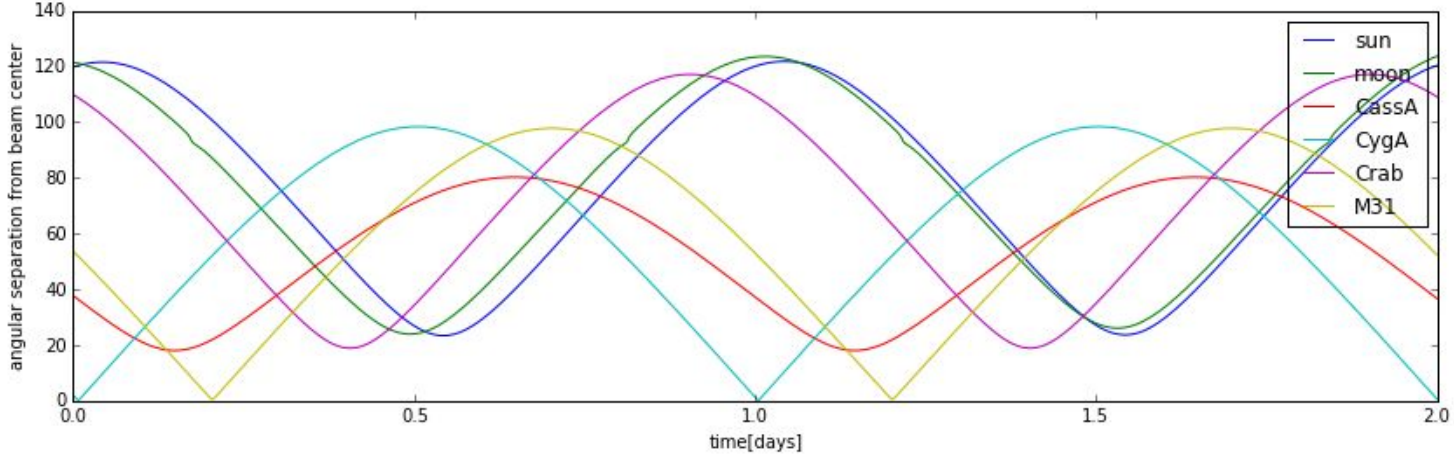


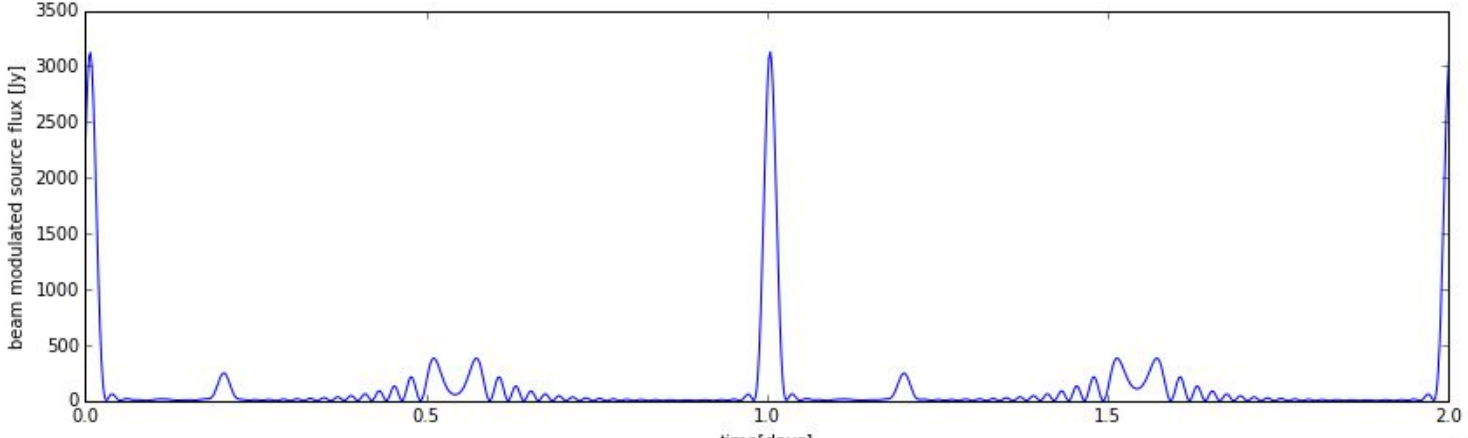
Beam for a 4m dish: Gauss and Airy



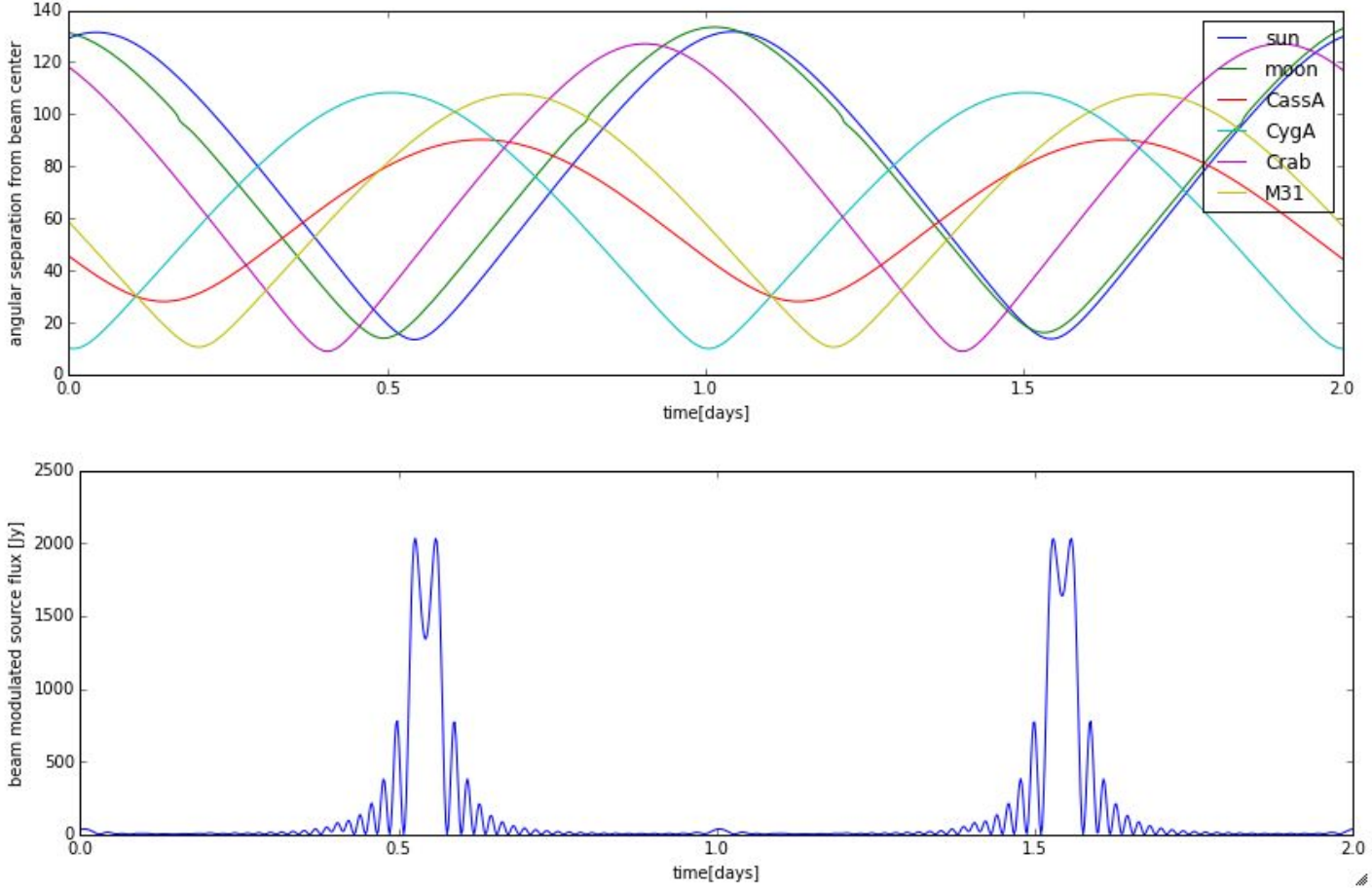


Zenith at 800MHz

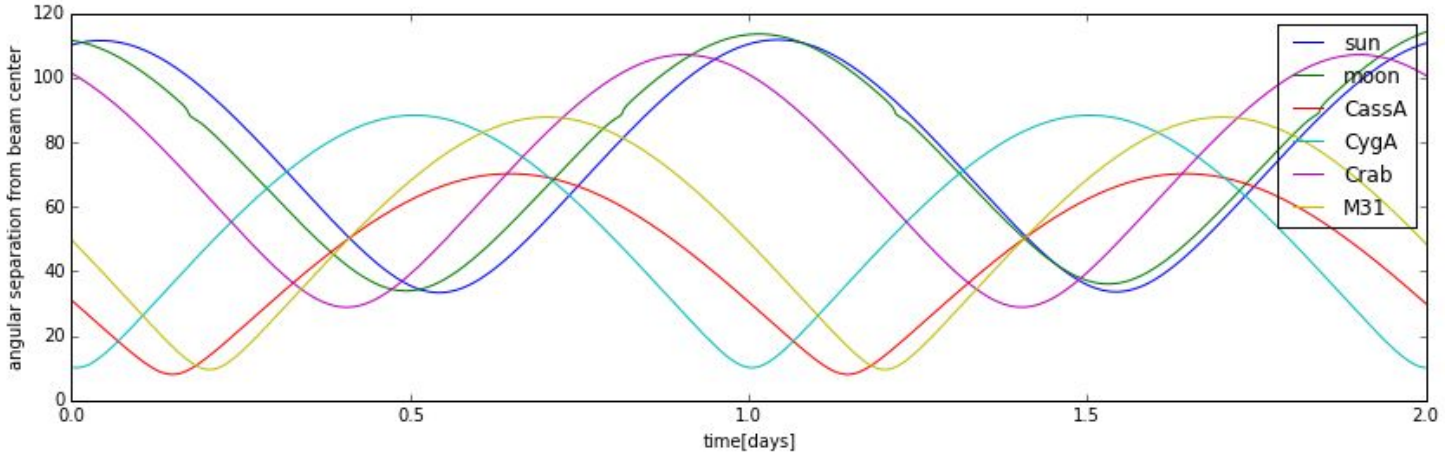


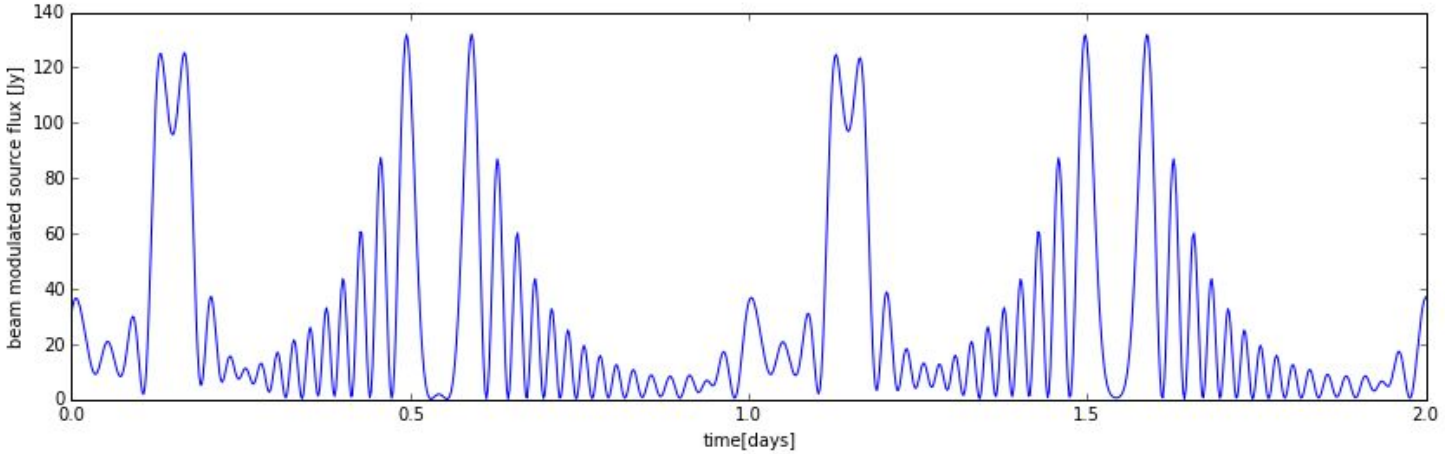


10 deg south


angular separation from beam center
time[days]
sun
moon
CassA
CygA
Crab
M31
beam modulated source flux [Jy]
time[days]

10 deg north


angular separation from beam center
time[days]
sun
moon
CassA
CygA
Crab
M31


beam modulated source flux [Jy]
time[days]

At what SNR?

Putting these numbers together:

At 800 MHz with 50K system temperature,

You get:

$$\Delta S \sim \frac{10^4 \mathrm{Jy}}{\sqrt{t\Delta\nu}}$$

So, we have error of about 10Jy in 1Mhz channel in one second.

$$\sigma_b = \frac{\lambda}{d\sqrt{8\log 2}}$$

$$\Omega = 2\pi\sigma_b^2$$

$$S_n = \frac{2k_b\Omega T}{\lambda^2}$$

$$\Delta_S = \frac{S_n}{\sqrt{t\Delta\nu}}$$

Should see everything on previous page with enormous SNR (too good to be true?)

10 deg north in log scale